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ABSTRACT

Validity and reliability data are presented for two instruments for assessing the predispositions that people have toward the use of assistive and educational technologies. The two instruments, the Assistive Technology Device Predisposition Assessment (ATDPA) and the Educational Technology Predisposition Assessment (ETPA), are self-report checklists with a consumer form and a version to be completed by professionals. The instruments are designed to identify for consumers of technology, their families, and advocates likely sources of mismatches between the user and the technology. Criterion-related validity was assessed for the ATDPA by asking 12 older adults with hearing loss and 8 members of a continuing education group to complete the instrument and a battery of 8 other tests. Results suggest the ATDPA's value in assessing factors involved in device use. The criterion-related validity of the ETPA was supported by results with 52 college students (26 hearing impaired), including an evaluation of hypercard use. The interrater reliability of the ATDPA was studied with 30 professionals rating 3 potential users, and that of the ETPA was studied through responses of 24 raters (music education undergraduates) rating 2 potential users. Both instruments seem to do a good job assessing the predispositions toward technology use of potential consumers. Six tables present study findings. There is a three-item list of references and an appendix containing the interview questions for the ETPA criterion-related validity study. (SLD)

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Early Validity and Reliability Data for Two Instruments Assessing the Predispositions People Have Toward Technology Use: Continued Integration of Quantitative and Qualitative Methods

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Early Validity and Reliability Data for Two Instruments

Assessing the Predispositions People Have Toward Technology Use:

Continued Integration of Quantitative and Qualitative Methods

The use of both educational and assistive technologies in a wide variety of educational settings has increased exponentially in the past few years. For example, IDEA, or Individuals with Disabilities Education Act of 1990 (formerly the Education of the Handicapped Act), now explicitly includes assistive technology as an area to be considered when developing a child's Individual Education Plan (IEP). A need for assistive technology devices must be considered along with the child's other educational needs and it must be identified on an individual basis. Cost and/or lack of availability of equipment cannot be used as an excuse for denying an assistive technology service and parents have the right to appeal if assistive technology services are denied. Postsecondary students must be provided "reasonable accommodations" according to Section 504 of the Rehabilitation Act of 1973 and employees of educational institutions are protected under the Americans with Disabilities Act. The term "reasonable accommodations" for persons with disabilities frequently means the provision of assistive technologies.

The definition of instructional and educational technologies vary in the literature from:

* electromechanical or computerized means of instructional delivery (e.g. hypercard stacks, telecourses)
* the process of developing and designing instruction according to cognitive psychology and learning theory.

Thus, technologies can range from what is written on the blackboard, to overheads and handouts, to hypercard stacks and telecourses. For the purposes of this paper, we are assuming the former definition and that educators desire to better match individuals with electromechanical or computerized technologies.

In all levels of education, for students with or without disabilities, such educational technologies as computer tutors and telecourses have expanded the options for addressing individual students' particular learning styles and needs. It is, therefore, becoming increasingly important to be able to understand the differences between those who successfully employ technologies and those who avoid or abandon their use.

An earlier AERA paper (Scherer & McKee, 1991) discussed the value of integrating quantitative and qualitative methods using a Participatory Action Research design to develop two instruments assessing the quality of the match between an individual and a particular technology being proposed for that person's use. Both instruments are self-report checklists with a consumer form (items were identified by individuals with disabilities) and a version designed to be completed by professionals. Items are of varied format, including 5-point Likert scales and checklists. The two instruments, the **Assistive Technology Device Predisposition Assessment (ATD PA)** and the **Educational Technology Predisposition Assessment (ET PA)** each have four subscales so that characteristics of the technology, the individual's temperament, and the environment in which the person will use the technology can be separately assessed. The purpose of the instruments is to identify for consumers, their families, and advocates the likely source(s) of person and technology mismatches so that steps to facilitate a match can be taken (see Figure 1). Shared perspectives between consumer and professional can be assessed by comparing the responses each makes to the items on their version of the ATD PA or ET PA.

The two most immediate concerns regarding the instruments are the extent to which they adequately assess the myriad influences on technology use (content and criterion-related validity) and, since the instruments are comprised of items requiring subjective judgements, the effect of "scorer variance" (inter-rater reliability). The description and results of the initial efforts employed to address these concerns form the primary objective of this paper.

METHODS AND DATA SOURCES

Methods used to develop the instruments are described in detail in, most recently, Scherer and McKee (1991, 1990) and Scherer (1991). Briefly, the methods and data sources described here are limited to information

collected to assess the instruments' criterion-related validity and data regarding the inter-rater reliability of the two instruments. Since the ATD PA and ET PA were created from the actual experiences of people who used or did not use a technology provided to them, and on-going discussions with consumers and professionals in the field as well as continuous reviews of the literature all tend to support the items included, the instruments have adequate content validity.

Criterion-Related Validity: ATD PA

Members of the Rochester area organization, Self-Help for the Hard-of-Hearing (SHHH) were asked to complete the ATD PA and several other instruments regarding their predispositions to the use of assistive listening devices. For the most part, people who are active in SHHH wear hearing aids and use a variety of ALDs. The mean age of the active members of this group is around 60.

The membership of an organization dedicated to the continuing education of older adults was also asked to complete the ATD PA regarding their use of assistive listening devices. None of the individuals in this group wear hearing aids or use ALDs, but all have a demonstrated hearing loss. The mean age in this group of persons is approximately 65.

Each individual was asked to complete a battery of tests which included the following instruments:

Hearing Handicap Inventory for the Elderly -- Screening Version (10 items, 1 total score)

Rotter's Locus of Control Inventory (29 items, 1 total score)

Health-Promoting Lifestyle Profile (Walker, Sechrist & Pender, 1987) (48 items, 6 subscale scores) Perceived Health Status (sum of 3 items)

Multidimensional Health Locus of Control (Wallston & Wallston, 1978) (18 items, 3 subscales)

Self-Performance Survey -- Longer Version (Wallston, 1990) (a perceived competence measure) (total score)

Health Value Survey (Wallston) (rank order of 10 values)

The Communication Profile for the Hearing Impaired (Demorest & Erdman, 1984) (145 items, 27 subscales)

Assistive Technology Device Predisposition Assessment (Scherer & McKee, 1990) (44 items, 4 subscales)

The members of SHHH and the continuing education organization, while similar in age, differ in degree of hearing impairment and need for ALDs, with the SHHH members having more hearing loss and need for assistive listening devices. The purpose of the research was to explore the personal, health, communication and psychological differences between the two groups (contrasted groups design) and to determine the best measures to use in future attempts to distinguish potential users of assistive listening devices from non-users.

Criterion-Related Validity: ET PA

Telecourse satisfaction. Two pilot telecourses were offered Fall, 1991 with students and faculty at Rochester Institute of Technology and Gallaudet University. The course, "Black Civil Rights in the Twentieth Century," was taught by a RIT history professor with a Gallaudet "resource" or co-teacher. A professor at Gallaudet University taught "Mass Media and Deaf History" with a RIT faculty member as "resource teacher." The resource teachers were to facilitate student access to and utilization of the delivery system; they were not to provide instruction per se. Both courses were open to students at Gallaudet University and Rochester Institute of Technology/National Technical Institute for the Deaf. The maximum student enrollment for each course was set at 26, with the goal of having equal numbers of Gallaudet and RIT students enrolled in each course.

The instructional delivery involved captioned videotapes and movies, assigned readings using a variety of print materials, and class discussions via computer conferencing technology (electronic mail over Internet). Students had computer access days, evenings, and weekends. Students were given an orientation prior to the beginning of the course on how to use Internet. All assignments were read and graded through the use of electronic mail.

At the end of the course, students from each institution were asked to complete a course evaluation as well as participate in an interview regarding their satisfaction with the method of instructional delivery (the interview protocol is in Appendix A). The interviewer was a graduate student who had been given training in interviewing skills and who had excellent sign language skills. The interviewer was also asked to

provide feedback summarizing the information gained from the student interviews. Students who were interviewed also completed the "learner characteristics" portion of the **Educational Technologies Predisposition Assessment** (ETPA) (Scherer, Young & McKee, 1990). Additionally, comments, insights, and recommendations regarding the delivery system were solicited from the two primary faculty for the courses.

Satisfaction with instruction delivered by hypercard. A hypercard stack was created to augment an existing instructor-based, lecture/discussion course offered to first year deaf NTID/RIT science majors in need of improved study skills. The hypercard stack offers a self-paced method of instructional delivery. One module, Test Taking, was pilot tested with all 9 students enrolled in the Fall, 1991 science department Freshman Seminar. Evaluation sessions were conducted one-on-one and involved the students' use of the hypercard stack. The computer screen was videotaped, showing cursor movements and choices as students moved through the stack. Students were interviewed during their navigation of the stack regarding their satisfaction with the system and ways it could be improved. Following this, students completed a satisfaction questionnaire (see Appendix A). One week later, students completed the "learner characteristics" portion of the ET PA.

Inter-rater Reliability: ATD PA

During a workshop on sensory devices presented at the 1990 Annual Conference of RESNA (an interdisciplinary association for the advancement of rehabilitation, assistive and educational technologies) 30 participants (all of whom were professionals or graduate students in such fields as rehabilitation engineering, pediatric medicine, speech and physical therapy) were shown three videotaped interviews with individuals considering using an assistive technology. Additional information concerning the individuals, the technology under consideration and their physical needs was given to the participants in writing. The three case histories included:

* a deaf, female, college student considering the use of more powerful, but larger and more visible hearing aids;
* a 10 year old visually impaired boy considering the use of a computerized reading machine;
* a 39 year old quadriplegic male believed to be in need of hearing aids.

The workshop participants were all asked to complete the ATD PA for each of the three cases and were interviewed as a group about their experiences with the instrument as a whole and with individual items.

Inter-rater Reliability: ET PA

Twenty four music education undergraduate students in an educational psychology course were shown two videotapes of interviews of students considering using a particular educational technology. Again, information not available from the videotape was supplied in writing. The case histories presented to the psychology students included:

* a 10 year old visually impaired boy given a software program for rhythm training;
* a female hearing-impaired college student learning to play the piano and provided with a computer tutor for musical notation.

Again, the students were asked to complete the ET PA for each of the two case studies. Item modes were calculated for all items and the difference between the mode and the individual raters' response was computed. Since we were only interested in differences from the mode, the sign. This array of difference scores allowed us to calculate an "average difference score." Years ago, a similar statistic based on the item mean, was called the mean deviate. Although, the mean deviate has some disadvantages when used in place of a standard deviation and hence is seldom used now, in this particular case, what we are calling the "average deviation from the mode" seems to be a logical and useful statistic. We were interested in the number of raters who chose the same or similar response for a given item for each case study. The closer the average difference score is to zero, the more consistent were the raters' judgements of the characteristics.

In Summary, the following data sources were used to asses the reliability and validity of the two instruments under discussion.

Content Validity	ATD PA and ET PA	Ongoing discussions with professionals in the field
Criterion-Related Validity	ATD PA	Comparison of ALD users and non-users
Criterion-Related Validity	ET PA	Satisfied and dissatisfied telecourse students Satisfied and dissatisfied hypercard students
Inter-rater Reliability	ATD PA	30 Raters each rate same 3 ATD potential users
Inter-rater Reliability	ET PA	24 Raters each rate same 2 ET potential users

RESULTS

Criterion-Related Validity: ATD PA

Twelve members of SHHH and eight members of the continuing education organization completed the full battery of assessment instruments. Since the number of individuals is small (a total of 20 respondents), the data analysis is descriptive only. Table 1 reports the group means and t statistics of those items and subscales for which the mean responses of the two groups differed significantly. As can be seen in Table 1, only two of the nine assessment instruments resulted in significant mean differences: Four of the 27 subscales of The Communication Profile for the Hearing Impaired (CPHI) and three of the four subscales of the ATD PA. The four CPHI subscales are: Communication performance at home, communication performance under adverse listening conditions, maladaptive behaviors when experiencing communication difficulty, and verbal strategies for managing communication difficulty. Of the nine instruments, the CPHI and ATD PA most directly addressed personality and psychosocial aspects of hearing loss (and, in the case of the ATD PA, of using assistive listening devices). Thus, the CPHI and ATD PA together suggest value in assessing the personality and psychosocial factors involved in device use.

Responses to the ATD PA indicate that the technology users (SHHH members) attribute more value to assistive listening device use than the members of the other group, are psychologically ready to adopt technical assistance, and perceive few difficulties with technology use around family, friends, and at work or school. SHHH respondents reported a great deal of perceived benefit to device use, a belief that device use will enhance their quality of life, and a view of devices as important in achieving their goals. The members of the continuing education organization reported the opposite. SHHH members also reported more perceived hearing loss than did the members of the continuing education organization, which is consistent with the audiometric data obtained from the respondents.

The SHHH members reported more maladaptive behaviors on the CPHI, but that may be attributable to their responses favoring the avoidance of problem listening situations. While the authors of the CPHI view this as "maladaptive," it is a philosophy of SHHH that members avoid situations or environments that are not conducive to their participation and where "verbal strategies" alone are not effective.

Criterion-Related Validity: ET PA

Telecourse satisfaction. The following results are based on surveys and interviews with a limited number of students. Ten students were interviewed, and eight returned end-of-course student rating forms. It is also important to note that the majority of the students who participated in the interviews were not on the same campus as the instructor; only one RIT student enrolled in **Black Civil Rights in the Twentieth Century** was interviewed, and no Gallaudet students enrolled in **Mass Media and Deafness** were interviewed. Finally, only one of the ten interviewees was hearing and we were not able to contact any of the students who dropped out of either of the courses. Thus, the results should be interpreted with caution.

Three students were identified as having been dissatisfied with the instructional delivery system based on the interview data (see Table 2). It must be remembered, however, that all students interviewed completed the course; we do not know the factors that were involved in student decisions to withdraw from the courses.

Both faculty and students who enjoyed the courses agreed that a major strength of the delivery system was the flexibility and control over the use of time afforded the student. However, those students who were not satisfied with the delivery system did not perceive such flexibility as a benefit and missed the structure of regular classes and the support of peers. Students who were not satisfied with the delivery system also missed the face to face contact with instructors and peers. In several cases, communication via the computer was not perceived as "real" interaction. "I never saw the teachers....there was not any interactions. Too impersonal."

The students who were most dissatisfied with the instructional delivery system said they prefer face-to-face discussions where they can watch facial expressions. The students from each institution who had the least satisfaction said that they are intimidated by computers, that computer use interferes with their social activities, and that they did not have the background skills for the course. None of the most satisfied students reported intimidation or social interference, and all but one said that they had the background skills for the course. The dissatisfied students self-reported more need for feedback, less adaptability, not viewing

the self as studious and as working carefully, and as thinking too much about their limitations. The data from the ET PA is in Table 3.

Satisfaction with instruction delivered by hypercard. While all students reported that the hypercard stack helped them learn "Test Taking" strategies and that they would use a similar mode of instruction again, responses to the satisfaction questionnaire indicated that five students were satisfied with this means of instructional delivery and that four students were dissatisfied with it. There were two students who reported being proficient computer users; both were satisfied users of the delivery system. The remainder of the students self-reported little or no prior computer use.

Those students with the most satisfaction reported that they prefer working alone as opposed to working in a group, that they are often anxious, and that they generally see computer use as being fun. The least satisfied students reported just the opposite. The satisfied students also more frequently reported that they are curious and excited about new things, are prepared most of the time, and have a cooperative attitude. Table 4 gives the percent of satisfied and dissatisfied students who chose each of the "learner characteristics."

A reasonable question to raise is the extent to which the ET PA data from the telecourse and hypercard evaluations support one another. A review of Tables 3 and 4 indicate that the students dissatisfied with either instructional delivery system reported more often than the satisfied students that they are intimidated by computers, have less physical dexterity, are less prepared and studious, work less carefully, have less desire to control their own learning pace, and prefer to work in a group than to work alone.

Inter-rater Reliability: ATD PA

The inter-rater agreement of the ATD PA is reported in Table 5. The first column gives the percentage of raters who gave exactly the same response to a given item and the second column is the statistic described earlier. As can be seen from Table 5, items related to the assistive technology itself and use of the technology within the family or workplace received the highest consistency in ratings. Items concerned with

user characteristics and whether or not that characteristic was an incentive or disincentive to device use received slightly agreement scores.

There was also some differences due to the particular case study. For example, there was generally higher agreement among the raters for Case B than for the other two cases.

Inter-rater Reliability: ET PA

Table 6 presents similar information for the ET PA. As can be seen from an inspection of Table 6, the majority of items were rated exactly the same by over half of the raters. Again, there was some variation between the two cases and generally Case B received the more consistent ratings. Certain case studies could have contained more complete information or simply were less susceptible to ambiguous interpretation. Verbal data provided by the participants provided some reasons for differences among the cases and suggestions for improving the scaling for several items and instruments.

DISCUSSION

As the use of assistive and educational technologies increase, there will be more concern directed towards their quality, selection, and the ways they impact overall quality of life. It is important to be able to analyze the constellation of factors serving to influence an individual's predisposition toward technology use or non-use so that the most appropriate technology for that person can be provided. The ATD PA and ET PA seem to have done a good job of discriminating predispositions to technology use on the part of satisfied and less satisfied users.

Based on results obtained to date, there are two self-report, easy-to-use checklist instruments available, both of which have reasonable validity and inter-rater reliability. The ATD PA and ET PA can be useful:

* in the earliest stages of matching a person with a technology by giving the consumer a means of providing direct input into the process of technology selection and making an informed choice,
* in identifying needed modifications in the technology,
* in reducing the frustration that often accompanies a poor match between individuals and the technologies meant to help them by providing criteria against which to assess the likelihood of satisfied technology use.

* and enabling persons to determine changes in predispositions to technology use over time.

Finally, the combined methodology of quantitative item analyses and qualitative verbal responses about the items proved to be valuable in assessing the usefulness of the two instruments. The methodology also demonstrates how the reliability and validity of subjective self-report, checklists, instruments designed chiefly to identify problems, not to develop norming information, can be done in a manner that yields meaningful results for the improvement of the instruments. This can be useful to other individuals constructing similar assessment instruments for which, additionally, there is no other existing instrument against which theirs can be correlated and, thus, one popular method of establishing construct validity is not possible.

Copies of the instruments as well as more complete descriptions of their development are available from the authors.

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Assistive Technology Influences

		Milieu	Personality	Technology
U S E	Optimal	Support from family/peers/ employer Realistic expectations of family/ employer Setting/environment fully supports and rewards use	Proud to use device Motivated Cooperative Optimistic Good coping skills Patient Self-disciplined Generally positive life experiences Has the skills to use the device Perceives discrepancy between desired and current situation	Goal achieved with no pain, fatigue or stress Compatible with/enhances the use of other technologies Is safe, reliable, easy to use and maintain Has the desired transportability No better options currently available
	Partial/ Reluctant	Pressure for use from either family/peers/employer Assistance often not available Setting/environment discourages use or makes use awkward	Embarrassed to use device Unmotivated Impatient/impulsive Unrealistic expectations Low self-esteem Somewhat intimidated by technology Technology partially or occasionally fits with lifestyle Deficits in skills needed for use	Goal not fully achieved or with discomfort/strain Requires a lot of set-up Interferes somewhat with the use of other technologies Device is inefficient Other options to device use exist
N O N U S E	Avoidance	Lack of support from either family/peers/employer Unrealistic expectations of others Assistance not available Setting/environment disallows or prevents use	Person doesn't want it Embarrassed to use device Depressed Unmotivated Uncooperative Withdrawn Intimidated by technology Many changes required in lifestyle Does not have skills for use	*Perceived* lack of goal achievement or too much strain/discomfort in use Requires a lot of set-up Perceived or determined to be incompatible with the use of other technologies Too expensive Long delay for delivery Other options to device use exist
	Abandonment	Lack of support from either family/peers/employer Setting/environment discourages or makes use awkward Requires assistance that is not available	Embarrassed to use device Depressed Low self-esteem Hostile/angry Withdrawn Resistant Poor socialization and coping skills Many changes in lifestyle with device use Lacks skills to use device and training is not available	Goal not achieved and/or discomfort/strain in use Is incompatible with the use of other technologies Has been outgrown Is difficult to use Device is inefficient Repairs/service not timely or affordable Other options to use became available

Scherer 1991

Table 1

Variables that Received Significantly Different Mean Responses from Assistive Listening Device Users and Non-users

Variable	Users (n=12) Mean	S.D.	Non-users (n=8) Mean	S.D.	t value	Sig
CPHI						
Performance: Home	3.30	.90	4.01	.43	2.28	.03
Performance: Adverse	2.56	.91	3.59	.63	3.00	.01
Maladaptive Behaviors	2.17	.41	1.49	.27	-4.52	.00
Verbal Strategies	3.71	.64	2.57	.68	-3.77	.00
ATD PA						
Able to Use	4.64	1.21	2.83	1.60	-2.41	.04
[Hearing] Capabilities	1.17	.58	2.57	.78	4.12	.00
Perceived Benefit	4.50	1.00	2.57	.78	-4.65	.00
Help Goal Achievement	4.08	1.08	2.29	.95	-3.77	.00
Limits from [Hearing Loss]	3.00	1.21	1.86	1.07	-2.14	.05
Change Way of Doing Things	3.17	1.34	1.83	.75	-2.70	.02
Comfort with Family	3.50	.67	2.86	.38	-2.66	.02
Comfort with Friends	3.58	.52	3.00	.00	-3.92	.00
Comfort at Work/School	3.60	.52	3.00	.00	-3.67	.01
Will Enhance Quality of Life	4.08	1.08	2.14	.69	-4.76	.00
Satisfaction with Life	.58	.52	.00	.00	-3.92	.00
Patient & Easy Going	.58	.52	.00	.00	-3.92	.00
Good Self-image	.92	.29	.00	.00	-11.00	.00
Has Little Privacy	.00	.00	.71	.49	3.87	.01
Technology Total	3.71	.81	2.81	.61	-2.75	.02
Temperament Total	2.03	.64	1.50	.28	-2.47	.03
Psychosocial Total	3.81	.63	2.91	.53	-3.31	.01

Table 2

Interview Data Regarding Learning Preferences

Questions and complete responses	
11G. Do you prefer to learn from listening to a lecture or by reading a textbook?	
GALLAUDET STUDENTS	
Student A:	I prefer to learn via lectures, group discussions, and textbooks. They all help me. I do not prefer just one style.
Student B:	I prefer to listen to a lecture because the teacher explains it more clearly. You get limited information from a book.
Student C:	I prefer to listen to a lecture. The teacher explains things clearer. If I have any questions the teacher can clarify. Also, the teacher can add interesting info to the discussion and the lecture.
Student D:	If the info is more complicated, then I prefer a lecture so the teacher can explain everything clearly. But if the topic is more social, then I can read it from a book and understand.
NTID/RIT STUDENTS	
Student E:	I think I would learn just as much from a lecture-style with this professor. But with other Prof's, it may be better with reading a test.
Student F:	Listening to a lecture.
Student G:	It depends. Sometimes I prefer a lecture; other times I prefer reading a book.
Student H:	Both. The lecture explains things, then the book goes into more detail.
Student I:	I prefer to read a textbook.
Student J:	I prefer them both plus open group discussions. I don't like just one way. They are all beneficial.
11H. Do you prefer to work alone or with a group?	
GALLAUDET STUDENTS	
Student A:	I prefer both. I prefer to read alone. But I prefer to have discussions in a group.
Student B:	I feel more comfortable working alone. I don't know why, just prefer it that way. I have more time and can focus more too.
Student C:	I prefer to work alone. It takes too much time to discuss things, cooperate and solve problems. I prefer just my opinion.
Student D:	I prefer to work alone. Otherwise people in a group share too much. I prefer to do what I want to do and whatever I feel like.
NTID/RIT STUDENTS	
Student E:	I prefer to work alone. I am a conscientious worker and prefer to be responsible for it.
Student F:	With a group.
Student G:	It depends again. Sometimes I prefer working with a group.
Student H:	I prefer alone. But I will participate in group discussions.
Student I:	I prefer to work alone. I grew up alone and I am very independent. I can focus a lot easier if I am alone.
Student J:	I prefer to do individual work. It wastes my time working in a group. Although, I can share within a class, I prefer to work alone
11I. Do you prefer to watch a demonstration or experiment on your own.	
GALLAUDET STUDENTS	
Student A:	I prefer to participate. I feel more comfortable that way.
Student B:	I would participate a little. But I feel more comfortable watching. Maybe if I participate I will learn more sometimes. But I feel more comfortable watching.
Student C:	I prefer to participate because I learn more from other students. But it depends on the course. In English class, for example, I prefer to work alone. But if I have to do some public speaking, then I prefer with a group so we can discuss ideas.
Student D:	I prefer to sit back and watch others. I hate to be involved with others. I don't know why. Involvement in sports is fine but school is more boring.
NTID/RIT STUDENTS	
Student E:	I prefer being involved.
Student F:	It depends if I am interested or not. If I am interested, then I will participate. But if I am not interested, then I prefer to watch others do it instead.
Student G:	I like to watch first. Then I like to help others after I see what is wrong.
Student H:	I like to be involved. It is more challenging.
Student I:	I prefer to work on my own and watch what others are doing.
Student J:	I prefer both. For example, I will sit and watch first what is going on. Then I will participate.

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Table 3

Characteristics of Students Who Were Satisfied or Dissatisfied with Teleconferencing

Characteristics	Number (and Percent) of Students Choosing Adjective to Describe Themselves	
	Satisfied students (N=7)	Dissatisfied students (N=3)
I am curious and excited about new things	6(86%)	3(100%)
I sometimes need frequent feedback	4(57%)	3(100%)
I sometimes feel intimidated by computers	0	3(100%)
I am impatient	1(15%)	0
I accept my teacher's advice about a course	6(86%)	1(33%)
I sometimes am easily distracted	3(43%)	2(67%)
I receive criticism well	3(43%)	2(67%)
I feel confident	3(43%)	2(67%)
I am sometimes easily bored	3(43%)	2(67%)
I move from task to task easily	4(57%)	2(67%)
My physical dexterity is good	3(43%)	1(33%)
Most of the time I am prepared	4(57%)	1(33%)
I like to have the teacher's attention	4(57%)	2(67%)
I would describe myself as studious	3(43%)	0
I sometimes feel anxious	5(71%)	3(100%)
I often want to work slower/faster than the rest	3(43%)	2(67%)
I have a cooperative attitude	5(71%)	2(67%)
Computer use often interferes with my social activities	0	2(67%)
I work carefully	3(43%)	0
I am sometimes critical	4(57%)	2(67%)
I prefer to work alone	5(71%)	1(33%)
I have the background skills for this course	6(86%)	0
I believe using a computer is fun	5(71%)	2(67%)
I am motivated to learn	5(71%)	3(100%)
I sometimes think too much about my limitations	2(29%)	3(100%)
I want to control my own learning pace	5(71%)	2(67%)
I think I'm flexible	6(86%)	3(100%)
I sometimes need frequent reinforcement	2(29%)	1(33%)
I work with precision	1(15%)	1(33%)
I think I'm adaptable	6(86%)	1(33%)
I prefer to watch a demonstration than to experiment on my own	(29%)	2(67%)
I prefer to read a textbook than to listen to a teacher's lecture	1(15%)	0
I prefer to work in a group than to work alone	1(15%)	2(67%)

Table 4

Characteristics of Students Who Were Satisfied or Dissatisfied with the Hypercard Stack

Characteristics	Number (and Percent) of Students Choosing Adjective to Describe Themselves	
	Satisfied students (N=5)	Dissatisfied students (N=4)
I am curious and excited about new things	5(100%)	2(50%)
I sometimes need frequent feedback	3(60%)	2(50%)
I sometimes feel intimidated by computers	0	1(25%)
I am impatient	3(60%)	1(25%)
I accept my teacher's advice about a course	1(20%)	1(25%)
I sometimes am easily distracted	3(60%)	2(50%)
I receive criticism well	3(60%)	2(50%)
I feel confident	5(100%)	3(75%)
I am sometimes easily bored	4(80%)	2(50%)
I move from task to task easily	4(80%)	3(75%)
My physical dexterity is good	4(80%)	2(50%)
Most of the time I am prepared	4(80%)	1(25%)
I like to have the teacher's attention	4(80%)	2(50%)
I would describe myself as studious	1(20%)	0
I sometimes feel anxious	5(100%)	0
I often want to work slower than the rest	2(20%)	1(25%)
I have a cooperative attitude	5(100%)	2(50%)
Computer use often interferes with my social activities	0	0
I work carefully	4(80%)	2(50%)
I am sometimes critical	2(40%)	2(50%)
I prefer to work alone	4(80%)	1(25%)
I have the background skills for this course	3(60%)	2(50%)
I believe using a computer is fun	5(100%)	2(50%)
I am motivated to learn	3(60%)	1(25%)
I sometimes think too much about my limitations	1(20%)	0
I want to control my own learning pace	3(60%)	1(25%)
I think I'm flexible	3(60%)	4(100%)
I sometimes need frequent reinforcement	0	1(25%)
I work with precision	1(20%)	1(25%)
I think I'm adaptable	4(80%)	3(75%)
I prefer to watch a demonstration than to experiment on my own	0	0
I prefer to read a textbook than to listen to a teacher's lecture	1(20%)	2(50%)
I prefer to work in a group than to work alone	1(20%)	3(75%)

Table 5

Inter-rater Agreement for the Three ATD PA Cases

Item	% Agreement			Mean Deviation From Mode		
	A	B	C	A	B	C
4-point scale:						
weight and size	68.0	70.4	43.5	.40	.56	.87
expense	65.4	88.9	35.0	.35	.26	1.25
service delivery	X	90.0	56.3	X	.30	.63
cognitive demands	84.6	84.6	60.9	.15	.39	.52
physical/sensory requirements	80.0	88.9	43.5	.20	.30	1.34
support services/training	56.5	75.0	36.8	.61	.46	1.00
3-point scale:						
Status with peers	60.0	66.7	39.1	.40	.52	.61
family	100.0	55.6	73.9	.00	.44	.30
general public	64.0	55.6	43.5	.36	.44	.78
self	48.0	63.0	63.6	.52	.37	.41
goal more easily achieved	44.0	41.7	42.9	.56	.56	.76
fits with lifestyle	44.0	43.5	36.4	.56	.56	.90
independent of assistance	75.0	92.0	63.6	.38	.08	.59
excited and in control	39.1	62.5	87.0	.83	.46	.13
5-point scale:						
incentive: supportive others	65.2	42.9	50.0	.78	1.33	1.67
cooperative attitude	30.4	33.3	27.8	1.70	1.76	2.17
independence	34.8	33.3	22.2	1.61	1.81	2.39
work/school	39.1	38.1	27.8	1.87	1.57	1.61
positive experiences	34.8	28.6	33.3	1.26	2.52	1.50
enhanced quality of life	30.4	23.8	55.6	2.13	1.52	.83
self-discipline, patience	34.8	28.6	44.4	1.34	2.52	1.28
incorporation of disability	34.8	66.7	38.9	2.30	1.04	1.72
not intimidated	52.2	47.6	33.3	1.26	1.71	1.83
positive outlook	26.1	33.3	27.8	1.34	1.33	1.78
disincentive: depression	31.6	35.3	47.1	1.89	1.82	1.18
unrealistic expectations	31.6	35.3	41.2	1.68	1.82	1.65
poor self-concept	26.3	41.2	47.1	2.42	1.23	1.53
hostility	42.1	41.2	35.3	1.05	.88	1.77
social withdrawal	42.1	47.1	35.3	.89	1.12	1.77
focuses on barriers	31.6	47.1	41.2	1.89	.65	1.11
poor coping skills	21.1	29.4	41.2	2.42	1.41	2.06
resistant	63.2	35.3	35.3	1.68	1.47	2.18
will interfere socially	26.3	41.2	41.2	1.63	1.18	1.89
no social integration						

Table 6
Inter-rater Agreement for the Two ET PA Cases

Item	% Agreement A	% Agreement B	Avg. deviation from mode A	Avg. deviation from mode B
5-point scale:				
goal agreement	56.5	73.9	.57	.34
appropriate technology	39.1	36.4	.87	.90
matches content aspects	34.8	36.4	.91	.68
physical demands	78.3	78.3	.26	.26
instruction in this modality	45.5	43.5	.72	.87
training/support needed	31.6	55.0	1.00	.80
reference materials available	37.5	47.1	1.00	.82
ease of set up, use	78.3	55.6	.30	.50
support personnel	38.1	47.4	1.23	1.58
able to purchase or rent	59.1	83.3	.54	.28
yes/no option:				
curious & excited	91.3	52.2	.08	.48
impatient	69.6	95.7	.30	.04
receives criticism	56.5	95.7	.43	.04
moves from task to task	60.9	69.6	.39	.30
needs teacher's full attention	100.0	91.3	.00	.09
pace of work	69.6	95.7	.30	.04
works with precision	87.0	91.3	.13	.09
background knowledge	65.2	87.0	.34	.13
focus on limitations	95.7	73.9	.04	.26
student controls learning pace	73.9	100.0	.26	.00
need for reinforcement	78.3	87.0	.21	.13
accepts teacher's advice	69.6	82.6	.30	.17
confidence	52.2	73.9	.48	.26
physical/sensory needs	87.0	82.6	.13	.17
studious	52.2	69.6	.48	.30
has intellectual abilities	91.3	100.0	.09	.00
critical	91.3	91.3	.09	.09
able to operate	73.9	95.7	.26	.04
sees as fun/helpful	69.6	73.9	.30	.26
flexible adaptable	65.2	78.3	.34	.21
imtimidated	95.7	91.3	.04	.09
distractable	87.0	100.0	.13	.00
bored	91.3	100.0	.09	.00
prepared	87.0	82.6	.13	.17
anxious	52.2	78.3	.48	.21
needs one-on-one	95.7	91.3	.04	.09
cooperative	78.3	82.6	.21	.17
interferes socially	65.2	69.6	.34	.30
prefers to work alone	100.0	95.7	.00	.04
motivated	91.3	95.7	.09	.04
5-point scale:				
family encouragement	95.7	56.5	.04	.69
status	34.8	47.8	.87	.82
independent of assistance	52.4	55.0	.95	.70
accessibility	54.5	57.9	.59	.47

APPENDIX A

INTERVIEW QUESTIONS FOR TELECOURSE STUDY AND STUDENT SATISFACTION QUESTIONS FROM HYPERCARD EVALUATION

Protocol for the Student Post-course Interview

RIT/Gallaudet University Project on the Instructional Application of Computer Conferencing Technology

M. Scherer, Fall '91

The interview is open-ended and loosely formulated so that as much undirected information can be elicited as possible. The object is to facilitate rather than to direct the responses.

Name_____ **Date**_____

Student is_____**deaf**_____**hearing**

Major_____

This past quarter you took a course [Black Civil Rights in the Twentieth Century/Mass Media and Deaf History]. This was the first time this course was taught through telecommunications and interactive computer dialoging with students here and at Gallaudet University.

We are very interested in learning how this course worked out for you and learning your opinions on how to make this course and others taught in the same way better. I have just a few questions to ask you.

1. Why did you register for this particular course?

   Any other reasons?

2. Please think back to your first group meeting about this course. What did you expect it to be like?

3. How did your expectations and opinions of it change over the quarter? What do you think most changed your opinion?

4. Overall, are you glad that you took this course as far as its content is concerned? Why or why not?

5. How well do you believe you achieved the goals of the course?

6. Are you glad that you took it as far as the <u>way</u> it was taught? Why or why not?

7. How was this method better or worse than the traditional classroom style of learning as far as you, yourself, are personally concerned?

   Better:

   Worse:

8. Please tell me about what this course was like for you as far as the need to work independently and with no traditional classroom interaction.

9. What did you do to structure and pace the coursework in order for you to meet the course requirements?

10. Please describe your interactions with:

    1. The course instructors

    2. The resource person

11. Please tell me what you learned most from this course about:

    1. The content of the course

    2. Your attitudes toward the subject matter of this course

    3. Your instructors and peers

    4. Your leaning style and needs (Probes: Did you learn easily using this method? Is this a method which you would use again? Do you prefer to learn from listening to a lecture or by reading a textbook? Do you prefer to work alone or with a group? Do you prefer to watch a demonstration or experiment on your own?)

12. What future applications do you see for courses taught this way?

    Any others?

Now please look at this page listing a variety of student characteristics. Please circle all the statements that describe you. (Hand student next page).

Student Characteristics of

_____

(Please print your name)

Please CIRCLE ALL statements that describe you:

I am curious and excited about new things	I sometimes need frequent feedback	I sometimes feel intimidated by computers
I am impatient	I accept my teacher's advice about a course	I sometimes am easily distracted
I receive criticism well	I feel confident	I am sometimes easily bored
I move from task to task easily	My physical dexterity is good	Most of the time I am prepared
I like to have the teacher's attention	I would describe myself as studious	I sometimes feel anxious
I often want to work slower/faster than the rest of the class	I have a cooperative attitude	Computer use often interferes with my social activities
I work carefully	I am sometimes critical	I prefer to work alone
I have the background skills for this course	I believe using a computer is fun	I am motivated to learn
I sometimes think too	I want to control my	I think I'm flexible
I sometimes need frequent reinforcement	I work with precision	I think I'm adaptable
I prefer to watch a demonstration than to experiment on my own	I prefer to read a textbook than to listen to a teacher's lecture	I prefer to work in a group than to work alone

Please list other characteristics that describe you as a learner in this course:

_____

_____

Interviewer Notes and Impressions: On attached sheet

[Include student's level of comfort, general affect, assessment of genuineness, and such problems as distractions during the interview, communication difficulties, etc.]

Questionnaire on Using the Study Skills Program

Name_____ Date_____

Major_____

We want to know if this computer program helps you learn. Please answer the following questions.

1. Have you ever used a computer program for learning?

   If so, did you like it? Why? Why not?

2. How is this method better or worse for you than traditional classroom teaching?

3. Please list three things you liked about this computer program.

   1)

   2)

   3)

4. Please list three things you did not like about this computer program.

   1)

   2)

   3)

5. Did you like working independently (no teacher, no peer group)? Why or why not?

6. Please tell me what you remember most for this material:

   a. What was it trying teach you?

   b. How much interest do you have in the material now?

   c. Is this a method you would use again?

   d. In your opinion, how do you learn best?

7. What advice do you have for teachers thinking about teaching material this way?

Student Characteristics of

_____

(Please print your name)

Please CIRCLE ALL statements that describe you:

I am curious and excited about new things	I sometimes need frequent feedback	I sometimes feel intimidated by computers
I am impatient	I accept my teacher's advice about a course	I sometimes am easily distracted
I receive criticism well	I feel confident	I am sometimes easily bored
I move from task to task easily	My physical dexterity is good	Most of the time I am prepared
I like to have the teacher's attention	I would describe myself as studious	I sometimes feel anxious
I often want to work slower/faster than the rest of the class	I have a cooperative attitude	Computer use often interferes with my social activities
I work carefully	I am sometimes critical	I prefer to work alone
I have the background skills for this course	I believe using a computer is fun	I am motivated to learn
I sometimes think too	I want to control my	I think I'm flexible
I sometimes need frequent reinforcement	I work with precision	I think I'm adaptable
I prefer to watch a demonstration than to experiment on my own	I prefer to read a textbook than to listen to a teacher's lecture	I prefer to work in a group than to work alone

Please list other characteristics that describe you as a learner in this course:

_____

_____

Interviewer Notes and Impressions: (on attached sheet)

[Include student's level of comfort, general affect, assessment of genuineness, and such problems as distractions during the interview, communication difficulties, etc.]